in which the column traces can be formed on the back side of a cover glass and row traces can be formed on the bottom side of a separate PET film. Substantially transparent glass subassembly **234** can have a stackup of layers that can include, in order from top to bottom, substantially transparent AG coating **213** (shown as a dashed line at the top of the subassembly), substantially transparent 0.7 borosilicate or aluminum silicate glass, black mask (in limited areas), and substantially transparent conductive material such as patterned ITO (15 to 200 ohm max, with 0.3 lines and 0.030 spaces) formed as columns. Note that the patterned ITO layer is symbolically illustrated in FIG. **2***a* as a dashed line representing patterning **250**. Substantially transparent PET subassembly **236** of thickness 0.188 can be bonded to glass subassembly **234** using PSA **208**. One purpose of PET subassembly **236** can be to support a substantially transparent layer of conductive material such as patterned ITO (75 to 500 ohm max, with 5.0 lines and 0.050 spaces) formed as rows, and also to provide a low capacitive layer between the rows and columns. The two layers of patterned substantially transparent conductive material can be of the same or different composition. Together, glass subassembly **234** through PET film subassembly **236**, and any intervening layers, can form the touchscreen.

[0040] FPC **204** can be bonded using ACF (0.003 after bonding) to the back side of glass subassembly **234**. FPC **226** can be also bonded using ACF to the rows that can be formed on the bottom of PET subassembly **236**. Substantially transparent PSA **214** of 0.125 thickness can be used to bond PET film subassembly **236** to LCD module **210**, which can include a 0.2 polarizer layer **215** and liquid crystals **217**. The complete assembly can then be mounted into window **216** in housing **218**. Note that when the complete assembly is mounted in housing **218**, glass subassembly **234** can be either even with or slightly recessed (0.3 Z step) from the top of the window.

[0041] FIG. **2***b* is similar to FIG. **2***a*, except that PET film subassembly **236** is not fully laminated to LCD module **210**. Instead, air gap **220** can be formed between them, and a ring of Poron **222** can be formed around the perimeter of the touchscreen.

[0042] FIG. **2***c* is similar to FIG. **2***b* in that it includes air gap **220**, but it can be mounted into an enclosure having overhanging bezel **224**.

[0043] FIG. **2***d* is a hybrid of FIGS. **2***a* and **2***c*, wherein overhanging bezel **224** can allow the blackmask step to be eliminated, and full lamination can be used (see full layer of PSA **208**).

[0044] FIGS. **3***a* and **3***b* illustrate various exemplary touch screen sensor panel stackups with columns and rows that can be formed on opposite sides of a single substrate according to one embodiment of this invention.

[0045] FIG. **3***a* shows an approximately 0.9 substantially transparent PC (or glass) housing **318**. Bonded to housing **318** using 0.100 substantially transparent PSA **308** can be a stackup in which the column traces and row traces can be formed on opposite sides of a single substrate. Substantially transparent glass subassembly **338** can have a stackup of layers that can include, in order from top to bottom, for example, substantially transparent conductive material such as patterned ITO (15 to 200 ohm max, with 0.3 lines and 0.030 spaces) formed as columns, substantially transparent 0.7 borosilicate or aluminum silicate or chemically strengthened soda lime glass, and substantially transparent conductive material such as patterned ITO (75 to 200 ohm max, with 5.0 lines and 0.050 spaces) formed as rows. The two layers of patterned substantially transparent conductive material can be of the same or different composition. Note that the patterned ITO layers are symbolically illustrated in FIG. **3***a* as dashed lines representing patterning **319** and **350**.

[0046] FPC **330** can be bonded using ACF (0.003 after bonding) to the rows on the back side of glass subassembly **338**, and also another FPC (not shown in FIG. **3***a*) can be bonded to the columns which are on the front or top side of the glass. Clear PSA **314** of 0.100 thickness can be used to bond glass subassembly **338** to LCD module **310**, which can include polarizer layer **315** and liquid crystals **317**.

[0047] FIG. **3***b* is similar to FIG. **3***a*, except that glass subassembly **338** is not fully laminated to LCD module **310**. Instead, air gap **320** can be formed between them, and a ring of Poron **322** can be formed around the perimeter of glass subassembly **338**. AR films or coatings can be applied to the back of the touch glass, and the front of the polarizer, to minimize optical losses.

[0048] FIG. **3***c* is similar to FIG. **3***a*, except that passivation layers **301** are formed between patterning **319** and PSA **309**, and between patterning **350** and PSA **314**. Passiviation layers **301** can be formed from silicon oxide, and can serve to prevent acid in the PSA from attacking the patterned ITO. Passivation layers **301** can also physically protect the ITO and metal layers from other corrosive agents, such as sweat from an assembly operator during the manufacturing process, and can physically protect the ITO and metal layers from scratches during assembly. It should be understood that although the use of passivation layers between ITO patterning and the PSA is only shown in FIG. **3***c*, a passivation layer can be formed between the ITO or metal and the PSA in any of the embodiments described and shown herein.

[0049] FIGS. **4***a*-**4***d* illustrate various exemplary touch screen sensor panel stackups with rows and columns that can be formed on the back side of a cover glass according to one embodiment of this invention.

[0050] FIG. **4***a* shows window **416** that can be formed in 0.8 to 1.0 substantially transparent PC housing **418**. Within window **416** can be a stack-up in which the column and row traces can be formed on the back side of a cover glass. Substantially transparent glass subassembly **442** can have a stackup of layers that can include, in order from top to bottom, for example, substantially transparent AG coating **413** (shown as a dashed line at the top of the subassembly), substantially transparent 0.7 borosilicate or aluminum silicate glass, black mask (in limited areas), substantially transparent conductive material such as patterned ITO (15 to 200 ohm max, with 0.3 lines and 0.030 spaces) formed as columns, 0.025 mm substantially transparent dielectric (sol-gel TIO2) with vias, patterned metal (0.025 ohm max, 0.030 lines and 0.030 spaces), and a 0.188 layer of substantially transparent conductive material such as patterned ITO (75 to 200 ohm max, with 0.3 lines and 0.030 spaces) formed as rows. The patterned metal can be formed in the border areas of the touchscreen to connect to the rows and/or columns and route them to an edge of the touchscreen. The two layers of patterned substantially transparent conductive material can be of the same or different composition. Note that the patterned ITO layers, dielectric and metal are symbolically illustrated in FIG. **4***a* as a dashed line representing patterning **444**. Substantially transparent PET subassembly **406** can be bonded to glass subassembly **442** using substantially transparent PSA **408**. One purpose of PET subassembly **406** can be to support a 0.188